

FIRE ALARM PLAN CORRECTION LIST
2002 NFPA 72 and 2002 NFPA 70
To Accompany Architectural Review

Plans have been reviewed for compliance with the, 2003 National Fire Codes, the 1999 Standard Building Code, and the 1974 State Public Building Accessibility Act (1991 North Carolina Handicapped Code with 1996 revisions) **or** CABO/ANSI A117.1-1992. The following list does not necessarily include all deficiencies.

***NOTE: ITEMS WITH ASTERISK WILL BE FIELD VERIFIED BY STATE FIRE MARSHAL INSPECTOR. THESE ITEMS WILL BE REQUIRED ON PLANS AS OF MAY 1, 2006**

PLEASE NOTE: **Circled** items require correction by revised plans, addenda, field orders, or change orders before plans can be approved for construction. Answers in letter form are not acceptable. **Starting construction before plans approval may be considered as just cause, by the State, to issue a stop work order. [Rule 0780-2-3-.02(2)]**

I. PROCEDURES

1. **Provide two copies** of plans and one copy of specifications sealed (with signature and date) by a registrant in accordance with the Engineers Licensing Law Rules. [Rule 0780-2-3-.03 and A&E Rule 0120-2-.08(3)]
2. The fire alarm contractor must be certified in accordance with the Tennessee Alarm Contractors Licensing Act of 1991, TCA Title 62, and Chapter 32. (Call 615-741-9771 for additional information.) [Provide note on drawings and in specs.]

II. GENERAL

1. Provide a scaled Life Safety Plan. This plan shall include egress routes, occupant loads for places of assembly, all required exits including horizontal exits, exit stairs and exterior exit doors, and point of Fire Dept. entry. A letter from the local Fire Official may be required to show entry point. Show initiating devices such as pull stations and audible and visual devices and the distances between devices. [NFPA 101 9.6.2, NFPA 72 5.12 Thru 5.12.8]
2. Drawings shall be legible prints and all drawn to scale.
3. Identify use of rooms and spaces.
- 4.* Provide riser diagram to indicate all zones (e.g. signal receiving zones, signal send zones, fire wall compartments, zones per floor etc). Show all initiating devices, notification devices, auxiliary circuits, initiating circuits, and circuit designations.
- 5.* Designate conduit type(s), and locate all riser/plenum runs.
- 6.* Provide style and class of wiring used. [2002 NFPA 72 6.4.2.1 and 6.4.2.2]
- 7.* Specify type of system installed. [2002 NFPA 72 Chapter 3 Definitions]
- 8 Show fire/smoke wall ratings on electrical drawings.

9. System designer shall provide fire alarm legend on first sheet of the Fire Alarm design drawings.
10. The system designer shall design the system per the following codes: (NFPA 72, NFPA 70, NFPA 90A, NFPA 92A, NFPA 92B, NFPA 13, & NFPA 13R, NFPA 101, NFPA 14, NFPA 20).
- 11.* Provide complete list of all system components and devices, with manufacturer and model numbers of each. All components shall be UL or FM listed. (UL is shown for example only)
 - a. UL 864- Standard for Control Units for Fire-Protective Signaling Systems
 - b. UL 268 - Standard for Smoke detectors for Fire-Protective Equipment
 - c. UL 1971 - Standard for Signaling Devices for the Hearing Impaired
 - d. UL Subcategory UOJZ - Control Units
 - e. UL Subcategory UUKL - Smoke Control

III. Design

1. Manual fire alarm pull stations shall be located as described below: [NFPA 72 5.12]
 - a. Each manual fire alarm box shall be securely mounted throughout the protected area so that the operable part is between 3½ ft. and 4½ ft. above floor level, and shall be conspicuous, unobstructed, and accessible. [NFPA 72 5.12.4]
 - b. Manual fire alarm boxes shall be located within 5 ft. of the exit doorway opening at each exit on each floor. [NFPA 72 5.12.6]
 - c. Manual fire alarm boxes shall be mounted on both sides of grouped openings over 40 ft. in width, and within 5 ft. of each side of the opening. [NFPA 72 5.12]
 - d. Additional manual fire alarm boxes shall be provided so that the travel distance to the nearest fire alarm box will not exceed 200 ft. measured horizontally on the same floor. [NFPA 72 5.12.8, NFPA 101 9.6.2.4]
2. Smoke/Heat Detectors shall be located as described below, and surface mounted unless tested and listed for recessed mounting. [NFPA 72 Chapter 5]
 - a. Total (Complete) Coverage. If required and unless otherwise modified by 5.5.2.1.1 through 5.5.2.1.6, total coverage shall include all rooms, halls, storage areas, basements, attics, lofts, spaces above suspended ceilings, and other subdivisions and accessible spaces as well as the inside of all closets, elevator shafts, enclosed stairways, dumbwaiter shafts, and chutes. [NFPA 72 Chapter 5.5.2.1]
 - b. Partial Coverage. Where partial coverage is required, detection devices shall be provided in all common areas and work spaces, such as corridors, lobbies, storage rooms, equipment rooms, and other tenantless spaces where detector operation is in accordance with this Code for the environment in those spaces. [NFPA 72 Chapter 5.5.2.2]

- c. Selective Coverage. Where codes, standards, laws, or authorities having jurisdiction require the protection of selected areas only, the specified areas shall be protected in accordance with this Code. [NFPA 72 Chapter 5.5.2.3]
 - d. Spot-type heat or smoke sensing detectors shall be located on the ceiling not less than 4 in. from the sidewall or on the sidewalls between 4 in. and 12 in. from the ceiling, unless otherwise modified by section 5.6 or 5.7. [NFPA 72 5.6.3.1, 5.7.3.2]
- 3. All Visible/Audible appliances shall be located and mounted per NFPA 72. [NFPA 72 7.4.6 and NFPA 72 7.5.4]
 - a. If ceiling heights allow, wall-mounted audible appliances shall have their tops above the finished floors at heights of not less than 90 in. and below the finished ceilings not less than 6 in. Ceiling-mounted or recessed appliances shall be permitted. [NFPA 72 7.4.6.1 and 7.4.6.2]
 - b. Wall-mounted visible appliances shall be mounted such that the entire lens is not less than 80 in. and not greater than 96 in. above the finished floor. [NFPA 72 7.5.4]
 - c. If combination audible/visible appliances are installed, the location of the installed appliance shall be determined by the requirements of NFPA 72. [Audible NFPA 72 7.4, Visible NFPA 72 7.5]
 - d. Spacing of visible appliances shall be in accordance with Figure 7.5.4.1.1 and either Table 7.5.4.1.1(a) or Table 7.5.4.1.1(b). More than two visible notification appliances in the same room or adjacent space within the field of view must flash in synchronization. [NFPA 72 7.5.4.1.1 and 7.5.4.1.2(3)]
- 4.* Provide dBA ratings of all audible notification devices on drawings next to each notification device. [NFPA 72 7.4 and Table A.7.4.2] In residential sleeping areas, dBA at the pillow must be whichever is greater, - at least 75 dBA , 15 dB above the average ambient sound level or 5 dB above the maximum sound level having a duration of at least 60 seconds- If any barrier, such as a door, curtain, or retractable partition, is located between the notification appliance and the pillow, the sound pressure level shall be measured with the barrier placed between the appliance and the pillow.[NFPA 72 7.4.4.1 and 7.4.4.2]
- 5.* Provide the candela (**cd**) rating of all visible notification devices on drawings next to each signaling device. [NFPA 72 7.5]
- 6. Sprinkler system control valves and switches shall be monitored. Initiation of the alarm signal shall occur within 90 seconds of water flow at the alarm-initiating device when flow occurs that is equal to or greater than that from a single sprinkler of the smallest orifice size installed in the system. [NFPA 72 5.10 and 5.13]
- 7. Smoke Detectors for door release shall comply with NFPA 72 5.14.6.
 - a. If the depth of wall section above the door is 24 in. or less, one ceiling-mounted or wall-mounted detector shall be required on one side of the doorway only. If the depth of wall section above the door is greater than 24 in. on one side only, one ceiling-mounted or wall-mounted detector shall be required on the higher side of the doorway only. [NFPA 72 5.14.6.5.1.1 and 5.14.6.5.1.2]

- b. If the depth of wall section above the door is greater than 610 mm (24 in.) on both sides, two ceiling-mounted or wall-mounted detectors shall be required, one on each side of the doorway. [NFPA 72 5.14.6.5.1.3]
 - c. If a detector is specifically listed for door frame mounting or if a listed combination or integral detector-door closer assembly is used, only one detector shall be required if installed in the manner recommended by the manufacturer. [NFPA 72 5.14.6.5.1.4]
8. **FIRE STOPPING** Specify test number, hourly rating, and provide detail(s) in their entirety which include application instructions, material specifications and design illustrations without modification or manipulation directly on plans of current U.L. (or other approved third party nationally recognized testing laboratory) tested systems for each size and type of penetrating object such as metallic and nonmetallic electrical, fire protection piping, electrical wiring, or conduit through fire resistive assemblies SBC 705.4 and NFPA 101 8.3.5. The details must be provided directly in the plan set and not in Architectural Supplemental Instruction (ASI), addenda, or within the specifications or project manual. UL permits the free duplication and inclusion for design professionals in their designs (see "Important Information For Users Of This Directory, Use of This Directory" in Volume 1 of the 2004 printed Fire Resistance Directory - or - at the bottom of each "record" (i.e. UL system number) on the online certification directory available <http://www.ul.com> for UL's terms and conditions of use).
[<http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/gfilenbr.html>]
9. Provide Fire Alarm Systems Secondary Power source load calculations per NFPA 72 4.4.1.3 and 4.4.1.5.3.
- 10.* The Fire Alarm Control Panel circuit disconnecting means shall have a red marking, shall be accessible only to authorized personnel, and shall be identified as "FIRE ALARM CIRCUIT." The location of the circuit disconnecting means shall be permanently identified at the fire alarm control unit. (NFPA 72 4.4.1.4.2.2 and 4.4.1.4.2.3)

IV. MECHANICAL

- 1. Show sequence of operation for shut down of HVAC equipment.
- 2. Show location of all duct mounted smoke detector mounted in the supply duct downstream of all filters [2002 NFPA 90A 6.4.2.1(1)] and in the return air stream prior to any exhausting from the building or mixing with fresh air makeup. [SMC 406.1] These detectors must be wired to a central control panel which is constantly monitored or be wired to a general building alarm. [2002 NFPA 90A 6.4.4]
- 3. Systems with a fan capacity less than 2,000 CFM and which serve a means of egress must have automatic shutdown. [SMC 406.2]
- 4. Systems from 2,000 to 15,000 CFM must have a duct mounted smoke detector mounted in the supply duct downstream of all filters [2002 NFPA 90A 6.4.2.1(1)] and in the return air stream prior to any exhausting from the building or mixing with fresh air makeup. [SMC 406.1] These detectors must be wired to a central control panel which is constantly monitored or be wired to a general building alarm. [2002 NFPA 90A 6.4.4]

5. Systems over 15,000 CFM must have duct mounted smoke detector shutdown and smoke dampers in both the supply and return ducts to isolate the fan from the duct system. [2002 NFPA 90A 4.3.9.2] These detectors must be wired to a central control panel which is constantly monitored or be wired to the general building alarm. [2002 NFPA 90A 6.4.4]

V. ELECTRICAL

1. Provide a fire alarm system for all occupancies required by the 2003 National Fire Codes and 1999 Standard Building Code.
2. Occupant notification shall be by means of visible signals and voice announcements, live or pre-recorded, initiated by the person in the constantly attended location. The public address system must be audible above the ambient noise level and must be provided with an emergency power source. [NFPA 72 3.3.208, NFPA 101 12.3.4, NFPA 101 9.6.3]
3. Supervisory signals shall sound and shall be displayed either at a location within the protected building that is constantly attended by qualified personnel or at an approved, remotely located receiving facility. [NFPA 101 9.7.2.1]
4. Where fire department notification is required, the fire alarm system shall be arranged to transmit the alarm automatically. [NFPA 101 9.6.4.2]
5. The fire alarm control panel or an annunciating device must be located in an area where trouble signals can be monitored (audibly and visually). [NFPA 72 4.4.3.5, 4.4.6 and SBC 905.1.5.2] This is to be distinguished from a general alarm system.
6. A fire alarm zone indicator panel must be located at grade level at the normal point of fire department access or at a constantly attended building security control center. [SBC 905.1.3]
7. Initiation of the fire alarm system must be by either manual means or by a fire detection system or an automatic sprinkler system throughout the building. [NFPA 101 9.6.2 and SBC 905.1.1]
8. Initiating devices shall be installed in all areas, compartments, or locations where required by other NFPA codes and standards or as required by the authority having jurisdiction. [NFPA 72 5.4.5]
9. No one fire alarm zone may exceed 15,000 square feet. Each floor shall be zoned separately. [SBC 905.1.3]
10. Provide manual fire alarm pull station(s) at _____.
[NFPA 101 9.6.2.3]
11. Notification signals for occupants to evacuate shall be audible and visible signals in accordance with NFPA 72, National Fire Alarm Code, and ICC/ANSI A117.1.
[NFPA 72 7.4 and 72 7.5]
12. Provide fire alarm notification for rooms/areas _____.
[NFPA 101 9.6.3]

13. Fire alarm boxes must be mounted at a maximum of 54" above finished floor for side approach and 48" above finished floor for forward approach. [NFPA 72 5.12.4 and NCHC 4.10(b)]
14. In areas that have controlling equipment, not continuously occupied, automatic smoke detection must be provided at each control unit(s) (i.e., fire alarm control panel, etc.). Heat detection is permitted if ambient conditions prohibit installation of smoke detection. [2002 NFPA 72 4.4.5]
15. The emergency generator must provide power within ten seconds. [NFPA 101 7.9.1.3]
16. Smoke detectors controlling hold open devices must be located in accordance with 2002 NFPA 72 5.14.6. Hold open devices must release in accordance with NFPA 101 7.2.1.8, and must be tied into the fire alarm system per NFPA 101 9.6.5.2. Provide details.
17. Where required by NFPA 101 Chapters 11 through Chapter 42, an automatic fire detection system shall be provided in hazardous areas for initiation of the signaling system. [NFPA 101 9.6.2.11]
18. Coordinate the location of the manual pull station for activating the kitchen fire extinguishing system (manual pull station shall be located along the path of egress) [NFPA 96 10.5.1]
19. The operation of fire extinguishing systems or suppression systems shall initiate an alarm signal by alarm-initiating devices installed in accordance with their individual listings. [NFPA 72 5.11]
- 20.* Provide Supervisory Signal-Initiating Devices as applicable according to NFPA 72 5.13. (Control Valve Supervisory Signal-Initiating Device, Pressure Supervisory Signal-Initiating Device, Water Level Supervisory Signal-Initiating Device, Water Temperature Supervisory Signal-Initiating Device and Room Temperature Supervisory Signal-Initiating Device.)
21. Show on plans or specifications that system has an emergency power source. [NFPA 72 1.5.2.3]
22. System-type smoke detectors or other automatic fire detection devices located in elevator lobbies, elevator hoistways, and elevator machine rooms including machine space, control room, and control space used to initiate fire fighters' service recall shall be connected to the building fire alarm system. [NFPA 72 6.15.3.1]
- 23.* In facilities without a building fire alarm system, these smoke detectors or other automatic fire detection as permitted by NFPA 72 6.15.3.7 shall be connected to a dedicated fire alarm system control unit that shall be designated as "elevator recall control and supervisory panel," permanently identified on the control unit and on the record drawings. [NFPA 72 6.15.3.2]
24. Unless otherwise required by the authority having jurisdiction, only the elevator lobby, elevator hoistways, and the elevator machine room smoke detectors or other automatic fire detection as permitted by NFPA 72 6.15.3.7 shall be used to recall elevators for fire fighters' service. [NFPA 72 6.15.3.3]

25. Where the pump room is not constantly attended, audible or visible alarms powered by source other than engine starting batteries and not exceeding 125 V shall be provided at a point of constant attendance. [NFPA 20 9.4.2] These alarms shall indicate the following:
 - a. The engine is running (separate alarm).
 - b. The controller main switch has been turned to the off or manual position (separate signal).
 - c. Trouble on the controller or engine (separate or common signals).
- 26.* Show the following electrical and fire alarm connections:
 - a. Location of connections of all air handling shutdowns.
 - b. Location of connections to the kitchen hood fire extinguishing system that activates the fire alarm system. Show other required shutdowns in the event the extinguishing system is activated.
 - c. Location of all connections to shunt trip circuit breakers and gas solenoid valves - unless a mechanical gas line shut-off is specified.
 - d. Location of flow switch or alarm check valve connection to the general building alarm and central station or fire department.
 - e. Location of supervisory alarm connection from tamper switches on sprinkler system.
 - f. Location of water alarm switch and specify connection to general building alarm. [NFPA 13 6.9.2]
27. The connections between fire alarm systems and the HVAC system for the purpose of monitoring and control shall operate and be monitored in accordance with applicable NFPA standards. Smoke detectors mounted in the air ducts of HVAC systems shall initiate either an alarm signal at the protected premises or a supervisory signal at a constantly attended location or supervising station. [2003 NFPA 72 6.15.5.3]
28. The connections to the fire alarm system serving the protected premises, all detection devices used to cause the operation of HVAC systems smoke dampers, fire dampers, fan control, smoke doors, and fire doors shall be monitored for integrity in accordance with 2003 NFPA 72 4.4.7 and 6.15.5.2.
- 29.* Digital Alarm Communication Systems (DACT & DACR) where applicable shall be installed as per the following:
 - A. Digital Alarm Communicator Transmitter (DACT) shall be connected to the public switched telephone network upstream of any private telephone system at the protected premises. [NFPA 72 8.5.3.2.1.3]
 1. DACT shall be configured so that it shall seize the telephone line, disconnect an outgoing or incoming telephone call, and prevent use of the telephone line for other telephone calls until signal transmission has been completed.

2. DACT shall have the means to satisfactorily obtain a dial tone, dial the number(s) of the DACR, obtain verification that the DACR is able to receive signals, transmit the signal, and receive acknowledgment that the DACR has accepted that signal within 90 seconds per attempt.
 3. DACT shall have means to reset and retry if the first attempt to complete a signal transmission sequence is unsuccessful. A failure to complete connection shall not prevent subsequent attempts to transmit an alarm where such alarm is generated from any other initiating device circuit or signaling line circuit, or both. Additional attempts shall be made until the signal transmission sequence has been completed, up to a minimum of 5 and a maximum of 10 attempts.
 4. If the maximum number of attempts to complete the sequence is reached, an indication of the failure shall be made at the premises.
 5. A second means of signal transmission shall be provided. [NFPA 72 8.5.3.2.1.4]
- B. The Digital Alarm Communicator Receiver (DACR) shall be located at the supervising or subsidiary station and shall be connected to a minimum of two separate incoming telephone lines (numbers). The lines (numbers) shall have the following characteristics [NFPA 72 8.5.3.2.2.2]:
1. If the lines are in a single hunt group, they shall be individually accessible; otherwise, separate hunt groups shall be required. [NFPA 72 8.5.3.2.2.2 (1)]
 2. The lines shall be used for no other purpose than receiving signals from a DACT.
 3. The lines (numbers) shall be unlisted.
- C. The failure of any telephone line connected to a DACR due to loss of line voltage shall be annunciated visually and audibly in the supervising station.

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